

Thorectes maroccanus nov. sp. (Coleoptera: Geotrupidae, Geotrupinae, Geotrupini), a new species from Morocco, and its relationship with the Iberian and North African species of the genus

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Abstract: *Thorectes maroccanus* nov. sp. is described from Morocco. The differences with the Iberian and North African species of the genus are discussed. The new species is similar to *Thorectes laevigatus* (Fabricius, 1798), *Thorectes lusitanicus* (Jekel, 1966), *Thorectes perezvalcarceli* López-Colón & Bahillo de la Puebla, 2023, *Thorectes angeli* López-Colón & Bahillo de la Puebla, 2024 and *Thorectes baraudi* López-Colón, 1981, although these species are clearly distinguished by the conformation of the mandibles, the basal edge of the entire pronotum, the mesosternal process, the anterior tibia of the male and the aedeagus.

Key words: Coleoptera, Geotrupidae, Geotrupinae, Geotrupini, *Thorectes maroccanus* nov. sp., description, taxonomy, distribution, Morocco.

Resumen: *Thorectes maroccanus* nov. sp., nueva especie de Marruecos, y su relación con las especies ibéricas y norteafricanas del género (Coleoptera: Geotrupidae, Geotrupinae, Geotrupini). Se describe *Thorectes maroccanus* nov. sp. de Marruecos. Se discuten las diferencias con las especies ibéricas y norteafricanas del género. La nueva especie es semejante a *Thorectes laevigatus* (Fabricius, 1798), *Thorectes lusitanicus* (Jekel, 1966), *Thorectes perezvalcarceli* López-Colón & Bahillo de la Puebla, 2023, *Thorectes angeli* López-Colón & Bahillo de la Puebla, 2024 and *Thorectes baraudi* López-Colón, 1981, aunque estas especies se distinguen bien por la conformación de las mandíbulas, el reborde basal del pronoto entero, la apófisis mesosternal, la tibia anterior del macho y el edeago.

Palabras clave: Coleoptera, Geotrupidae, Geotrupinae, Geotrupini, *Thorectes maroccanus* nov. sp., descripción, taxonomía, distribución, Marruecos.

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Introduction

The genus *Thorectes* Mulsant, 1842 (Coleoptera: Geotrupidae) comprises 25 species with a circum-Mediterranean and Asian distribution: Turkey, Tajikistan, Nepal and northern India (NIKOLAJEV et al., 2016; LÓPEZ-COLÓN & BAHILLO DE LA PUEBLA, 2023a, 2023b, 2024), being *Scarabaeus laevigatus* Fabricius, 1798 the type species of the genus (LÓPEZ-COLÓN & ALONSO-ZARAZAGA, 2006; ALONSO-ZARAZAGA et al., 2015; ICZN, 2018). It is represented in North Africa by eleven species:

Thorectes laevigatus (Fabricius, 1798), *Thorectes trituberculatus* Reitter, 1892, *Thorectes armifrons* (Reitter, 1892), *Thorectes coiffaiti* Baraud, 1969, *Thorectes demoflysi* Baraud, 1965, *Thorectes latus* Sturm, 1826, *Thorectes puncticollis* P.H. Lucas, 1846, *Thorectes rugatulus* Jekel, 1866, *Thorectes reflexus* Jekel, 1866, *Thorectes coloni* Ruiz, 1998 as well as the one here described, whilst in the Iberian Peninsula it is represented by seven species: *Thorectes valencianus* (Baraud, 1966), *Thorectes lusitanicus* (Jekel, 1966), *Thorectes baraudi* López-Colón, 1981, *Thorectes ferreri* López-Colón, 1983, *Thorectes beturiensis* López-Colón & Bahillo de la Puebla, 2023, *Thorectes perezvalcarceli* López-Colón & Bahillo de la Puebla, 2023 and *Thorectes angeli* López-Colón & Bahillo de la Puebla, 2024 (BARAUD, 1965, 1971, 1985; RUIZ et al., 1995; RUIZ, 1998; NIKOLAJEV et al., 2016; LÓPEZ-COLÓN & BAHILLO DE LA PUEBLA, 2024).

Material and methods

To obtain the images that accompany this paper, serial photographs were taken at different focus planes using a Meopta laboratory microscope and a CMOS 5 digital camera. The photographs were subsequently stacked with Helicon Focus 8.2 software.

The material studied has been labelled as follows (Figs. 22-23):

- **Holotypus:** 1 ♂, White label: Taforalt env. (Morocco) / 28-29-IV-2012 / leg. P. Kylies, 700 m. Red label: *Thorectes maroccanus* ♂ / López-Colón, Kylies, Pucholt & Bahillo de la Puebla / HOLOTYPE. Green label: 3297/ Dok. L. Mencl 2025. The specimen is deposited in the private collection of Petr Kylies.
- **Allotypus:** 1 ♀, with the same labeling as the Holotype. The specimen is deposited in the collection of Petr Kylies.
- **Paratypi:** 2 ♂♂ and 3 ♀♀, with the same labeling as the Holotype. The specimens are deposited in the authors' collections as follows: Petr Kylies (2 ♀♀), Pavel Pucholt (1 ♂ and 1 ♀) and J.I. López-Colón (1 ♂).

Description

Thorectes maroccanus nov. sp.

Holotypus

Total length: 18, 5 mm.

Convex and broad, black in colour, shiny, without bluish lateral reflections. Cephalic tubercle conical, strong and fairly elevated; clypeus densely dotted; prominent cheeks. Antennae with the 3rd, 4th and 5th segments quite elongated; the first segment is reddish below in the apical half.

Upper edge of right mandible not sinuate, while the left is sinuate in the apical third. Maxillary palps black except for the apical end of the last one, which is reddish (Figs. 1-5).

Pronotum large, convex and transverse, without median depression on the anterior margin; the anterior angle straight, the posterior very rounded; the base with a continuous, not narrowed or much thinner rim on each side of the middle; two sunken spots stand out, one on each side, in the centre, equidistant between the anterior and posterior angles; with double, fine and superficial punctation, particularly the small spots, relatively sparse, evenly distributed, being somewhat denser on the lateral margins (Figs. 2 and 6).

Small triangular, transverse scutellum, twice as wide as long, with hardly any punctations (Fig. 7).

Elytra fused, with punctations not well aligned on the striae, very weak but visible, although partly erased, especially towards the base; the anterior angle sunken, concave (Fig. 8).

Mesosternal process raised, well evident, with the posterior part very elevated (Figs. 9-10).

Pygidium densely hairy, with black and prostrate hairs.

Abdominal sternites not punctated, glabrous (Fig. 11).

Front femora and mesofemora with anterior and posterior margins unarmed (Fig. 16). Metafemora unarmed, very thickened, without denticulation on the posterior margin, with the posterior line of dots slightly marked, hairy (Fig. 17).

Anterior tibiae with the apical tooth forked in the male; the third external tooth in the same plane as the others, not thickened; the ventral surface completely unarmed, concave, while the denticulation of the lower internal ridge has two strong teeth in the middle, one at the height of the middle of the third external tooth and the other next to it, at the height of the apical end of the fourth external tooth and three other smaller but well-defined teeth situated at the base, of which the first two, more developed, are slightly turned inwards, there being also three very small denticles in the distal part (Fig. 18 and 19).

Brachypterous. Wings extremely reduced, 0.65 mm long (Fig. 12).

Aedeagus with a length of 4.0 mm. Relatively slender. Widened towards the middle, at the level of the basal region of the parameres; the central notch on the dorsal side of the phallobase is long, reaching the middle of it. The dorsal basal arch of the parameres is very narrowed in the middle and prolonged on the left side, slightly directed towards the right side. Paramera with well-developed desclerifications on the mediodorsal margins (Figs. 13-15).

Allotypus

Female. Total length: 18,0 mm.

Similar to the male, but with the anterior tibiae of a different shape. The clypeus and forehead are densely dotted, although somewhat less so than in the male. Antennae with segments 3, 4 and 5 somewhat more elongated than in the male. Pronotum with the basal edge somewhat thinner on each side of the middle and the dots more or less similar, but slightly smaller.

Anterior tibiae with a simple, non-bifurcated apical tooth; the third external tooth in the same plane as the others, not thickened; the ventral surface is completely unarmed, concave, while the denticulation of the lower internal ridge has a series of teeth, all of them relatively large, but none stands out (Figs. 20-21).

Variation of the length

Total length of Paratype: 2 ♂♂: 12 and 16,7 mm; 3 ♀♀: 14,5, 15,0 and 15,5 mm.

Etimology / Derivatio nominis

The name *maroccanus* refers to the country (Morocco) where the specimens of the typical series were captured.

Discussion

The closest species to *Thorectes maroccanus* nov. sp. are *T. laevigatus*, *T. lusitanicus*, *T. perezvalcarceli*, *T. angeli* and *T. baraudi*. These species belong to a group of *Thorectes* with the following characteristics:

- elytra clearly convex.
- fine or very fine elytral punctation, sparse or practically non-existent, without recognizable alignment in striae.
- abdominal sternites glabrous and not punctated in the central region.
- clypeus with a conspicuous tubercle.
- posterior angles of the pronotum widely rounded.

However, according to LÓPEZ-COLÓN & BAHILLO DE LA PUEBLA (2024), there are five characters that separate *Thorectes maroccanus* nov. sp. from the rest of the species, including *T. laevigatus*, *T. lusitanicus*, *T. perezvalcarceli*, *T. angeli* and *T. baraudi*:

- Basal edge of the pronotum complete (Figs. 6-8).
- Right mandible not sinuate on its upper edge and left mandible sinuate on the apical third (Fig. 3).
- Mesosternal process raised, well evident, with the posterior part very high (Figs. 9-10).
- Anterior tibiae of male (Figs. 18-19) and female (Figs. 20-21) very characteristic.
- Aedeagus is also unmistakable (Figs. 13-15).

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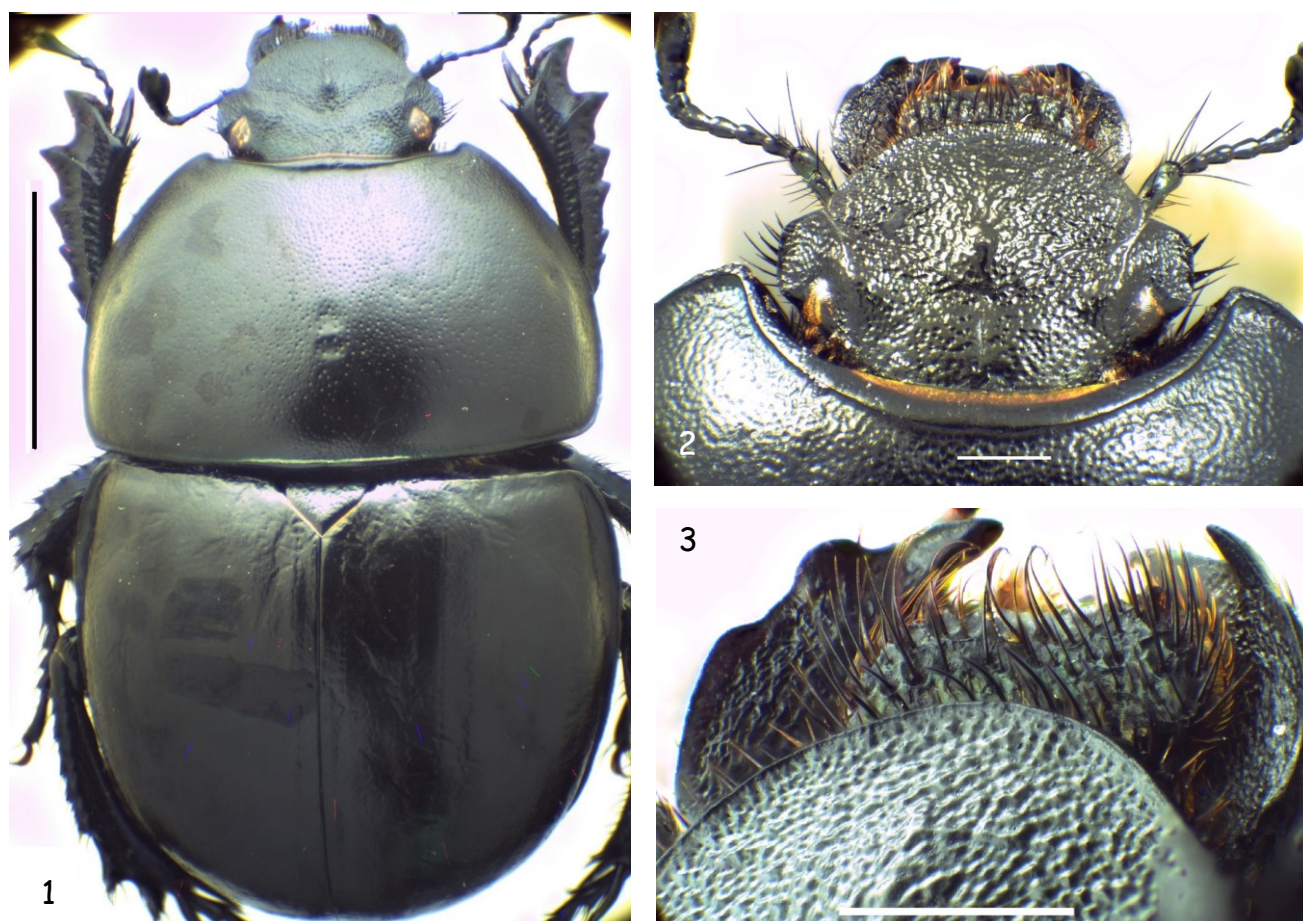
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Figs. 1-3.- *Thorectes maroccanus* nov. sp.

- 1.- Allotypus: dorsal view (scale: 5 mm).
- 2.- Holotypus: head, dorsal view with clypeal tubercle (scale: 1 mm).
- 3.- Holotypus: head, detail of the mandibles (scale: 1 mm).



Figs. 4-9. - *Thorectes maroccanus* nov. sp.

4. - Holotypus: head, ventral view (scale: 1 mm).

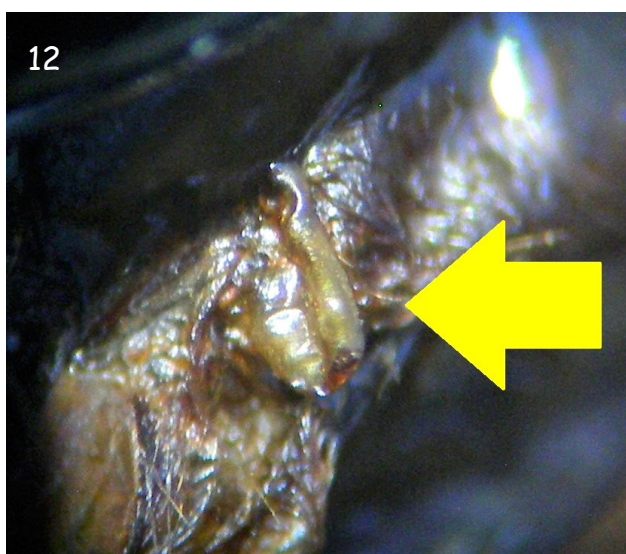
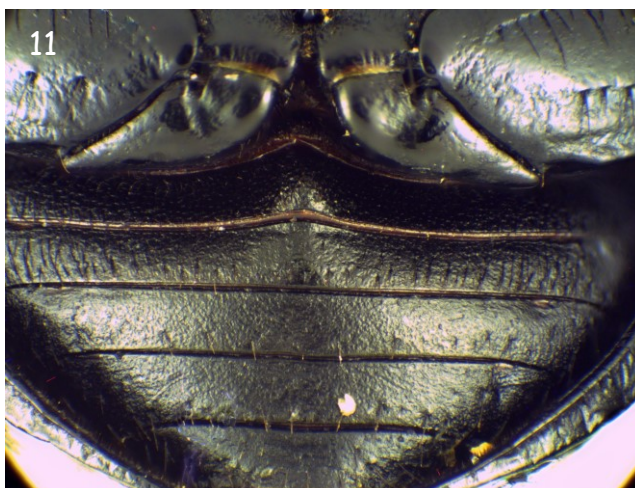
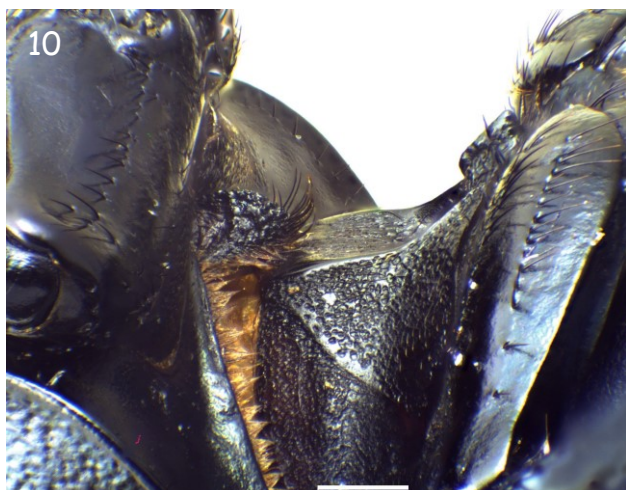
5. - Holotypus: antenna, ventral view (scale: 1 mm).

6. - Holotypus: posterior angle of the pronotum and anterior angle of the elytra (scale: 1 mm).

7. - Holotypus: scutellum (scale: 1 mm).

8. - Holotypus: anterior angle of the elytra (scale: 1 mm).

9. - Holotypus: mesosternal process, ventral view (scale: 1 mm).



Figs. 10-15. - *Thorectes maroccanus* nov. sp.

10. - Holotypus: mesosternal process, lateral view (scale: 1 mm).

11. - Holotypus: sternites (scale: 1 mm).

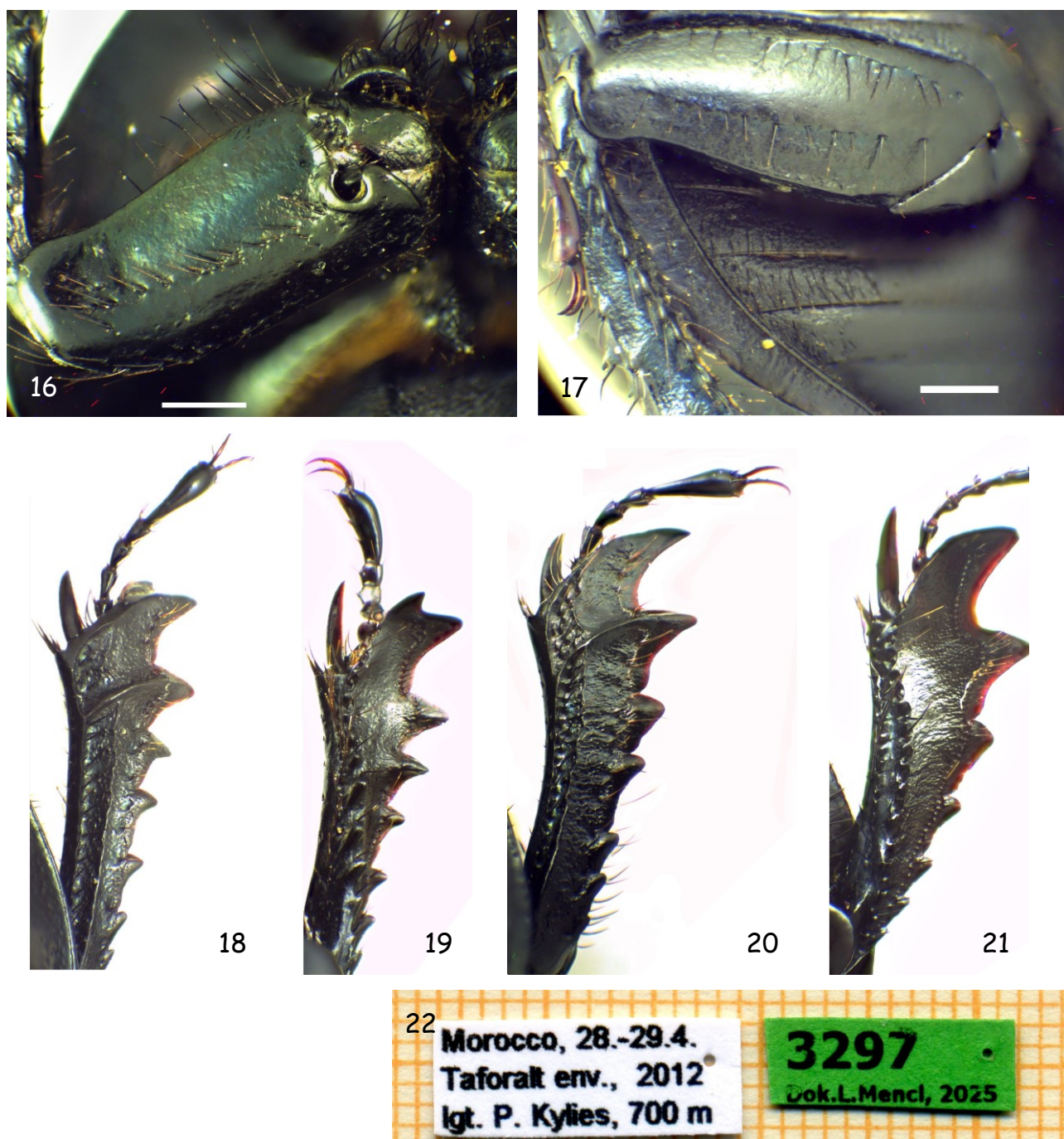
12. - Paratypus, male: atrophied wing.

13. - Holotypus: aedeagus, dorsal view (scale: 1 mm).

14. - Holotypus: aedeagus, lateral view (scale: 1 mm).

15. - Holotypus: aedeagus, ventral view (scale: 1 mm).





Figs. 16-23. - *Thorectes maroccanus* nov. sp.

- 16. - Holotypus: profemur, ventral view (scale: 1 mm).
- 17. - Holotypus: metafemur, ventral view (scale: 1 mm).
- 18. - Holotypus: Anterior tibia, dorsal view.
- 19. - Holotypus: Anterior tibia, ventral view.
- 20. - Allotypus: anterior tibia, dorsal view.
- 21. - Allotypus: anterior tibia, ventral view.
- 22. - Holotypus: original labels.
- 23. - Holotypus: second label.

